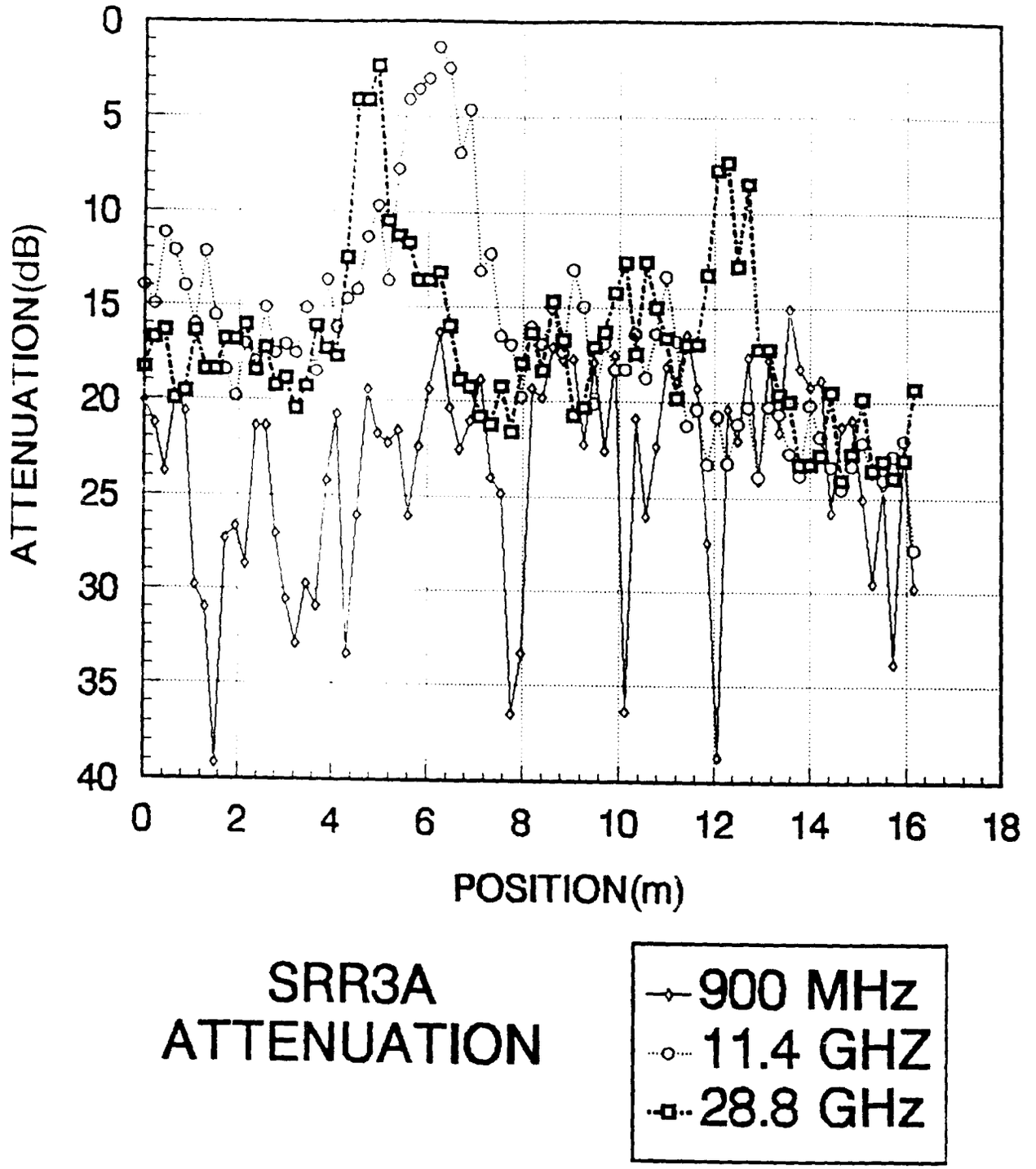

Figure A-47. Penetration loss for storeroom path SRR3A.

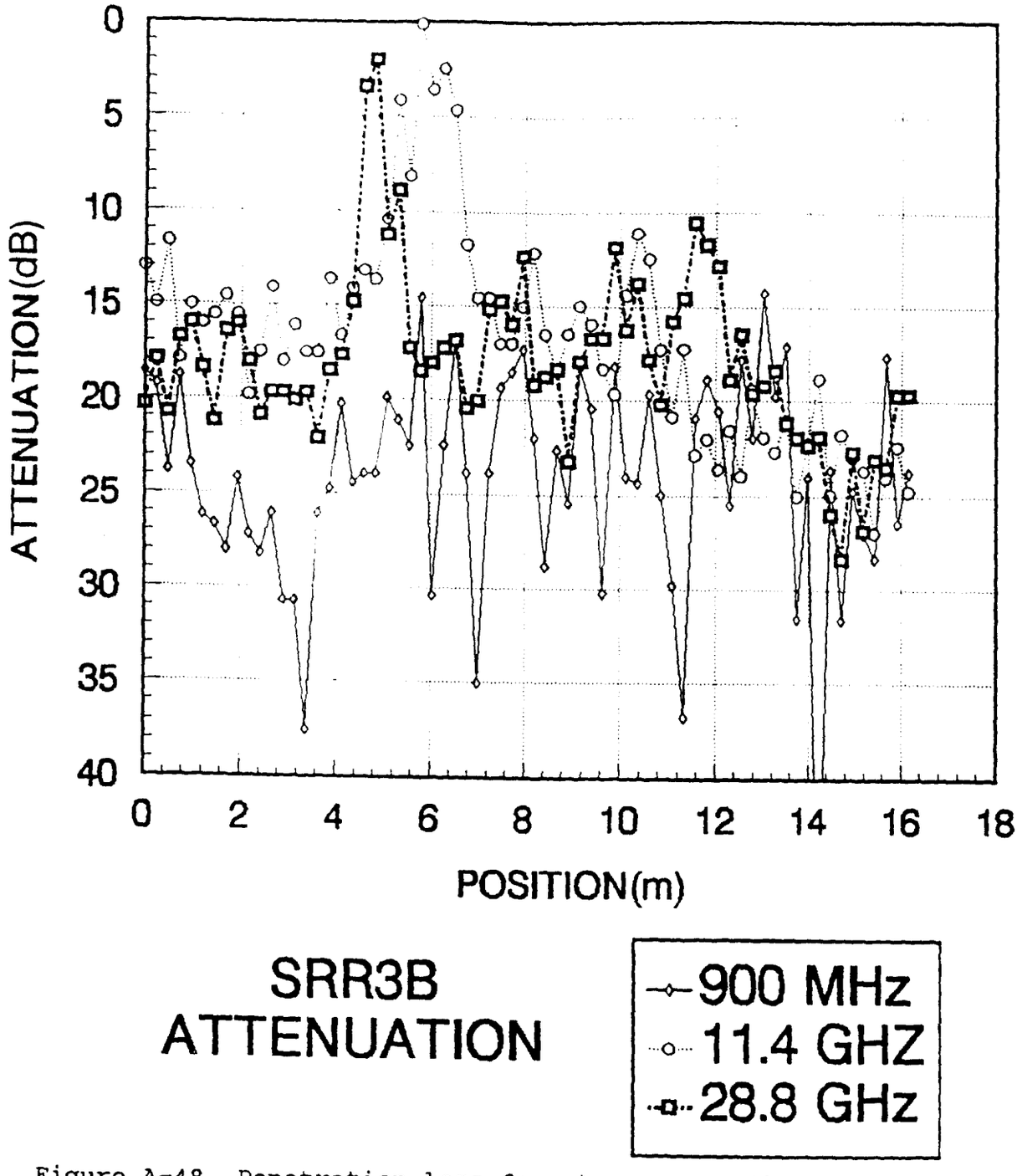

Figure A-48. Penetration loss for storeroom path SRR3B.

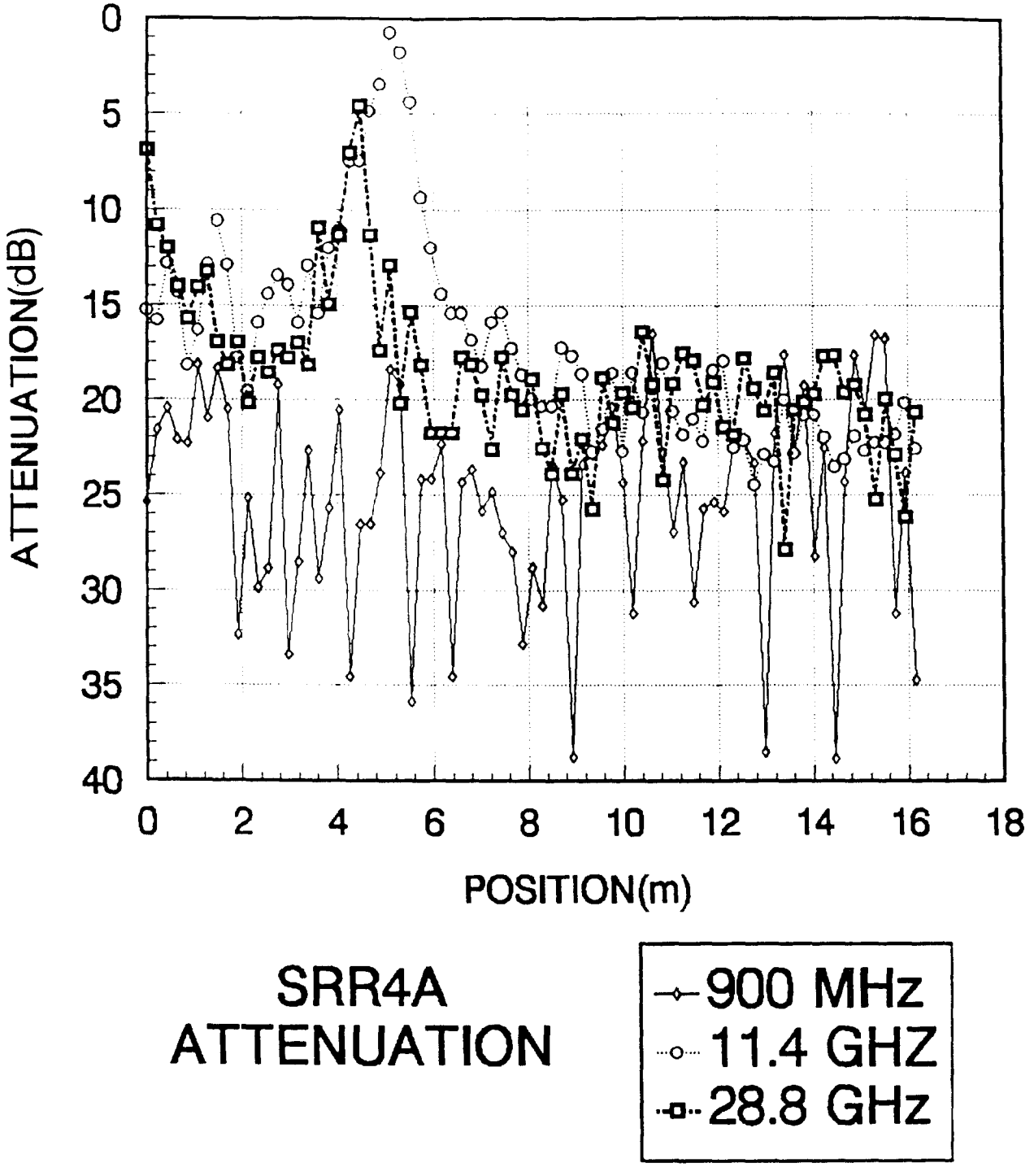

Figure A-49. Penetration loss for storeroom path SRR4A.

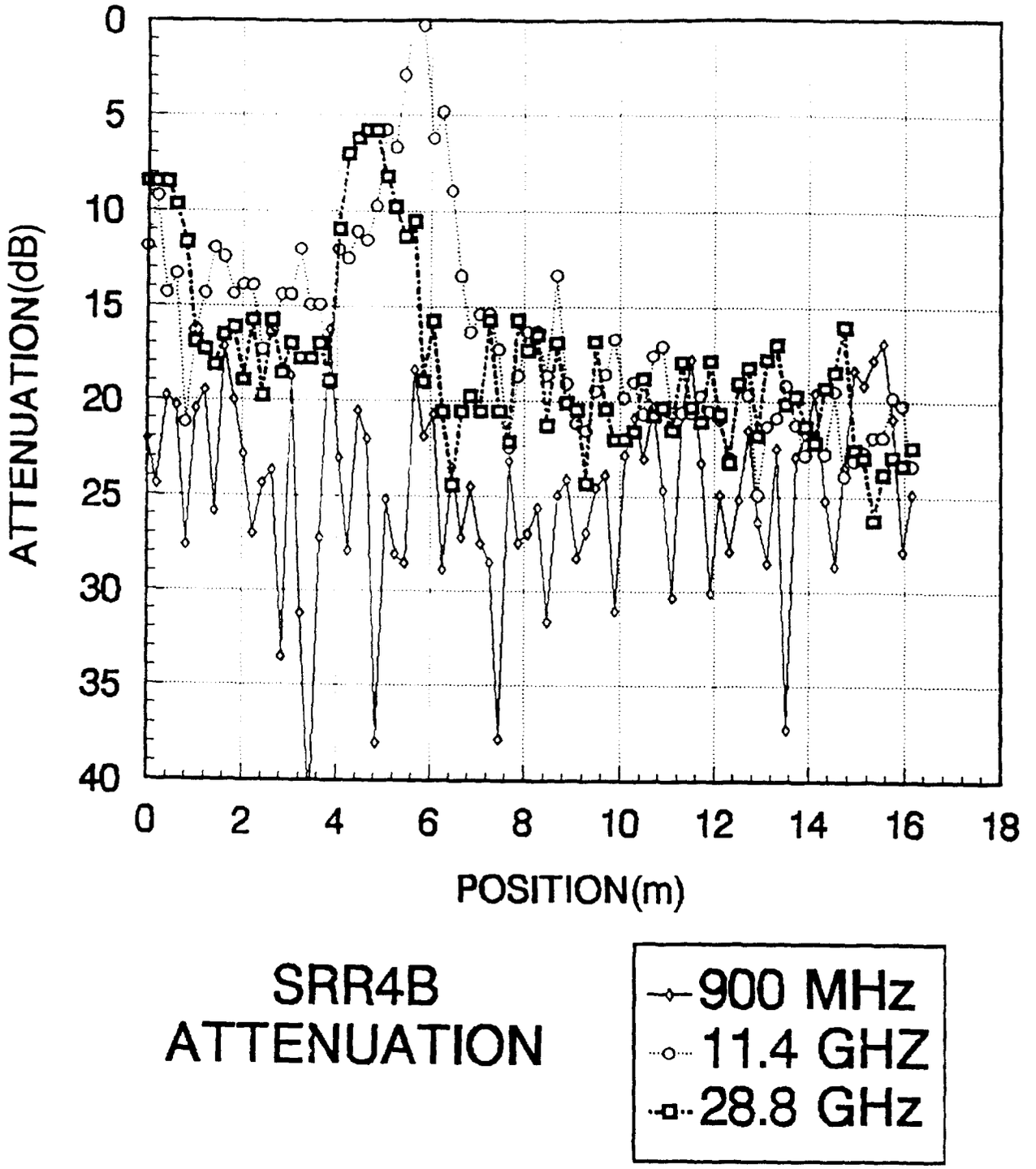

Figure A-50. Penetration loss for storeroom path SRR4B.

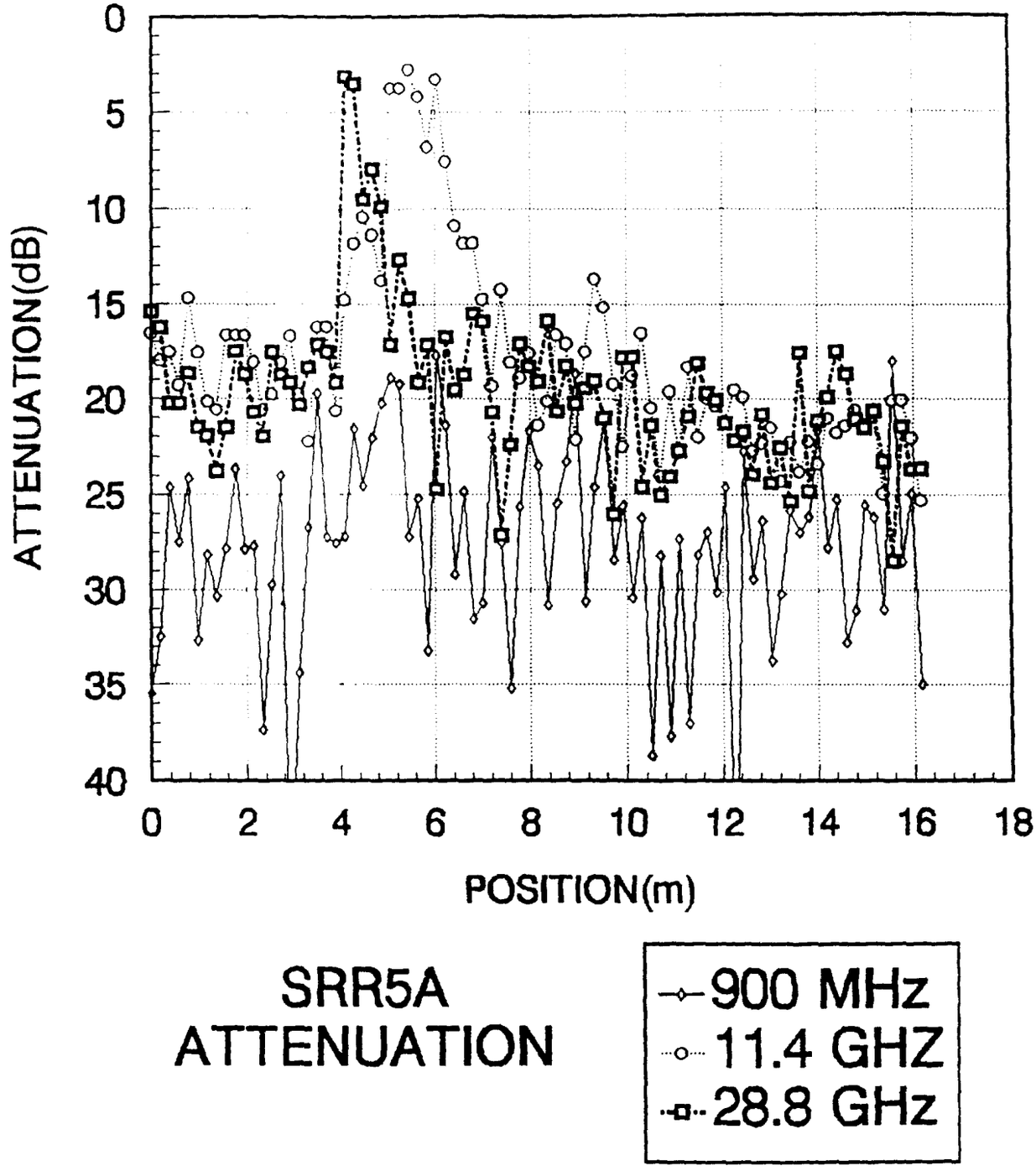

Figure A-51. Penetration loss for storeroom path SRR5A.

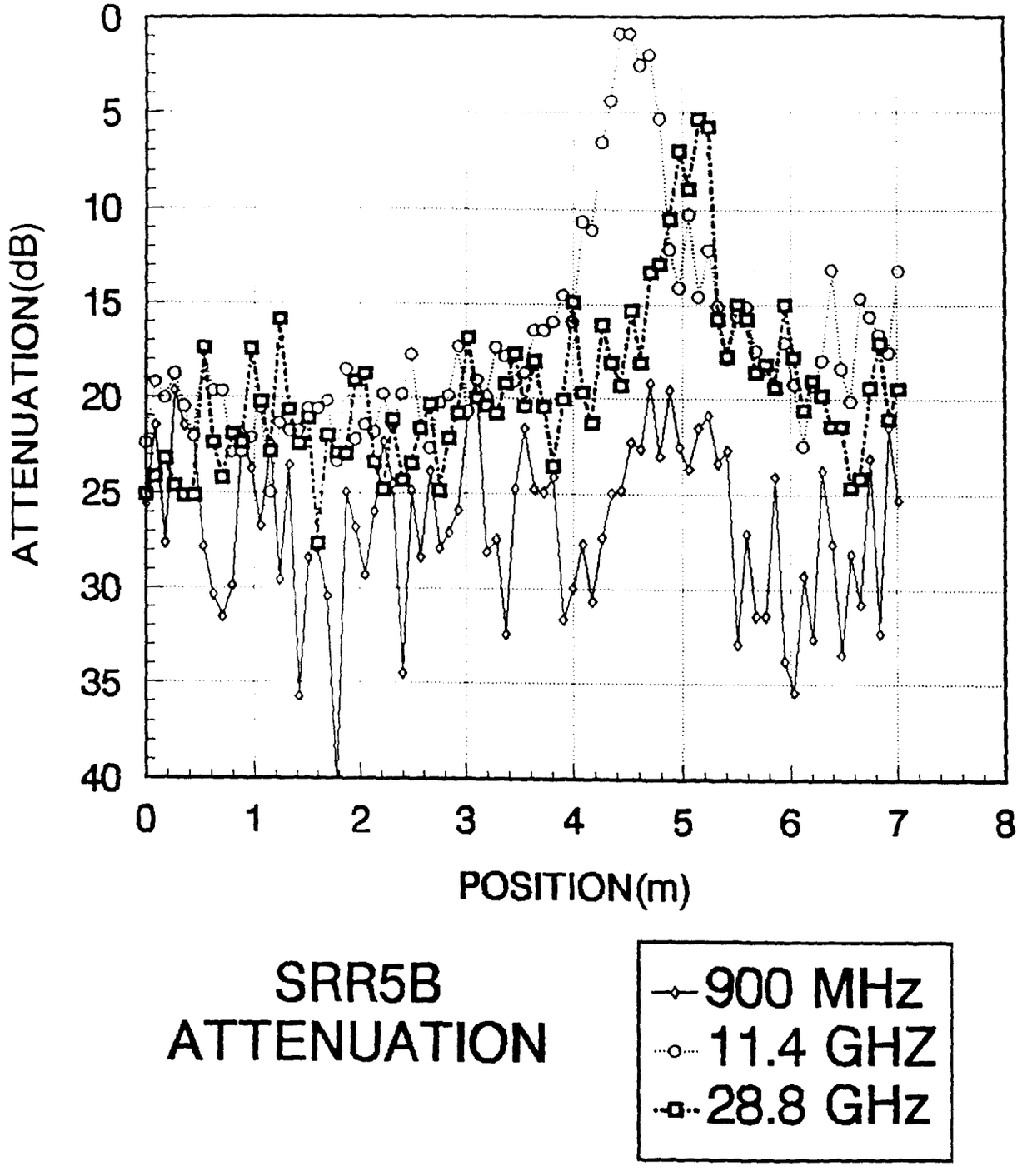

Figure A-52. Penetration loss for storeroom path SRR5B.

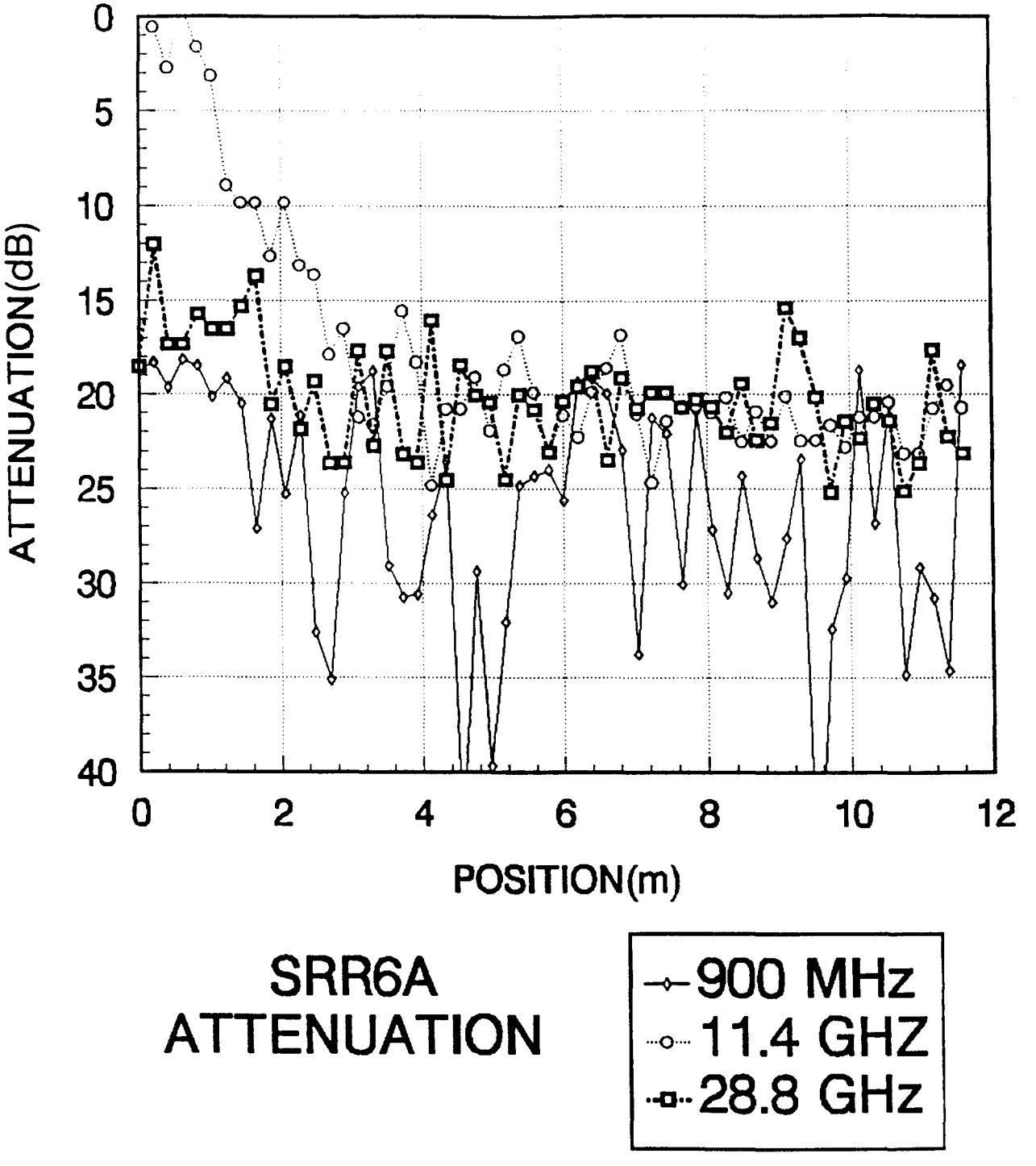

Figure A-53. Penetration loss for storeroom path SRR6A.

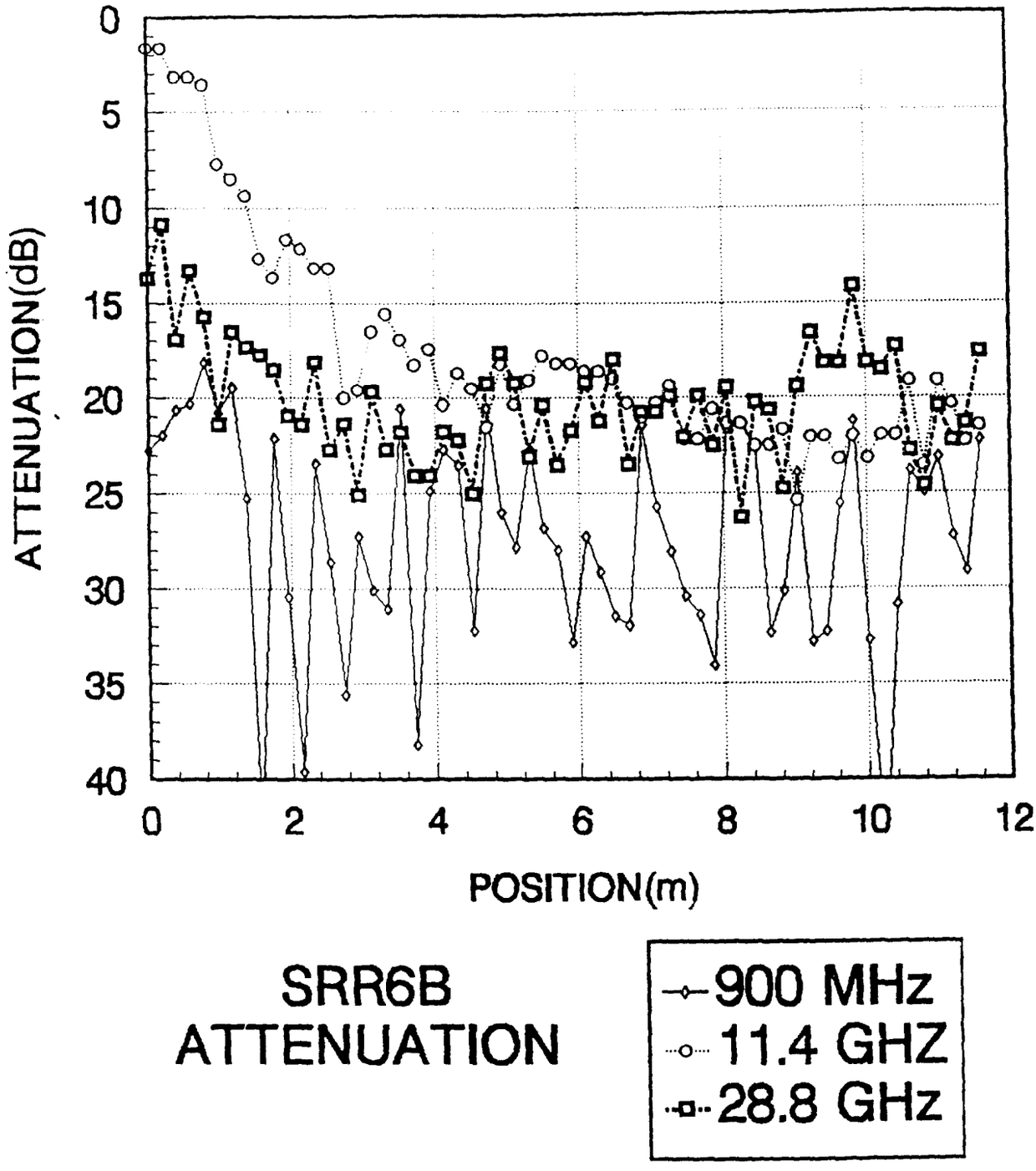

Figure A-54. Penetration loss for storeroom path SRR6B.

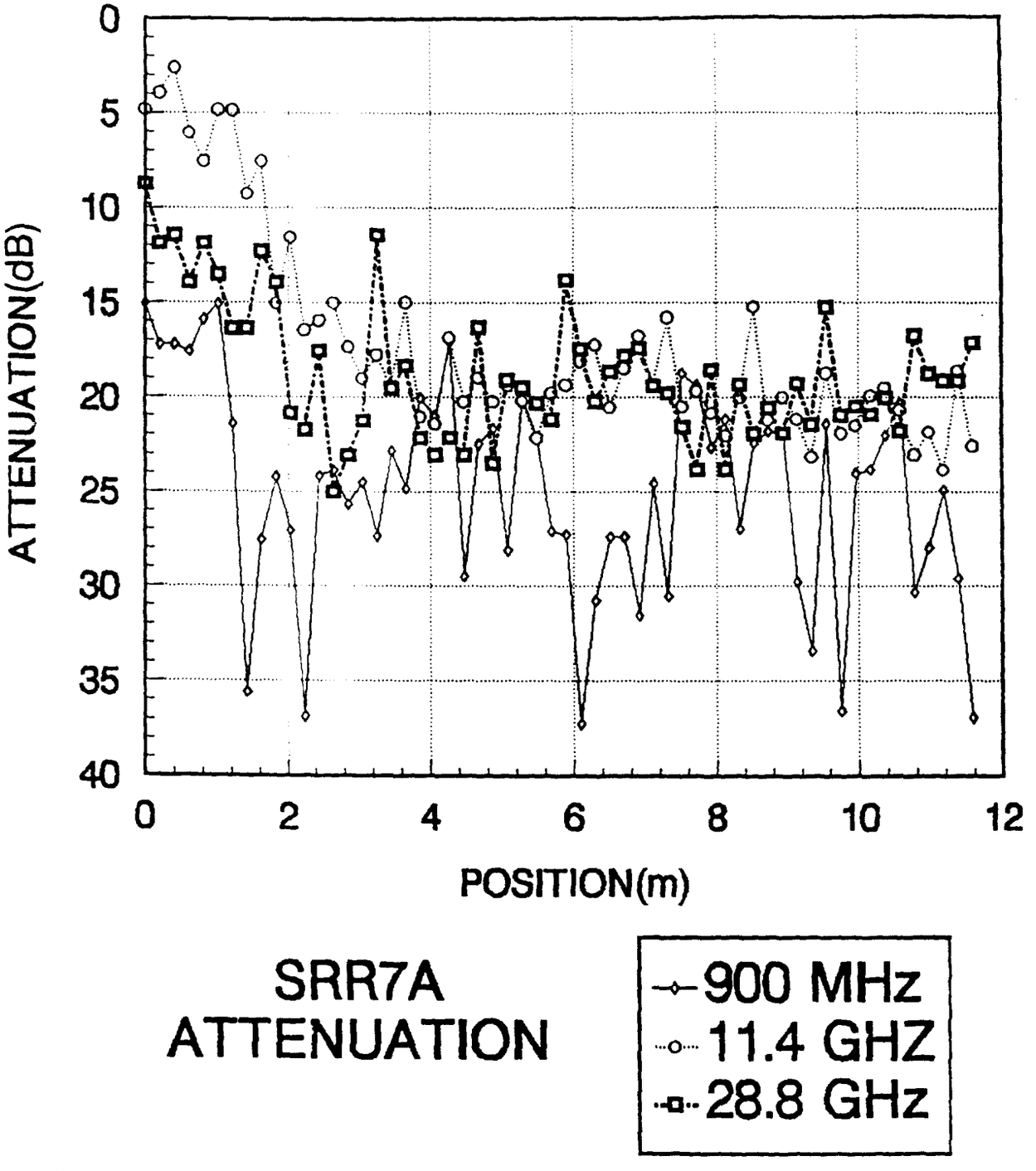

Figure A-55. Penetration loss for storeroom path SRR7A.

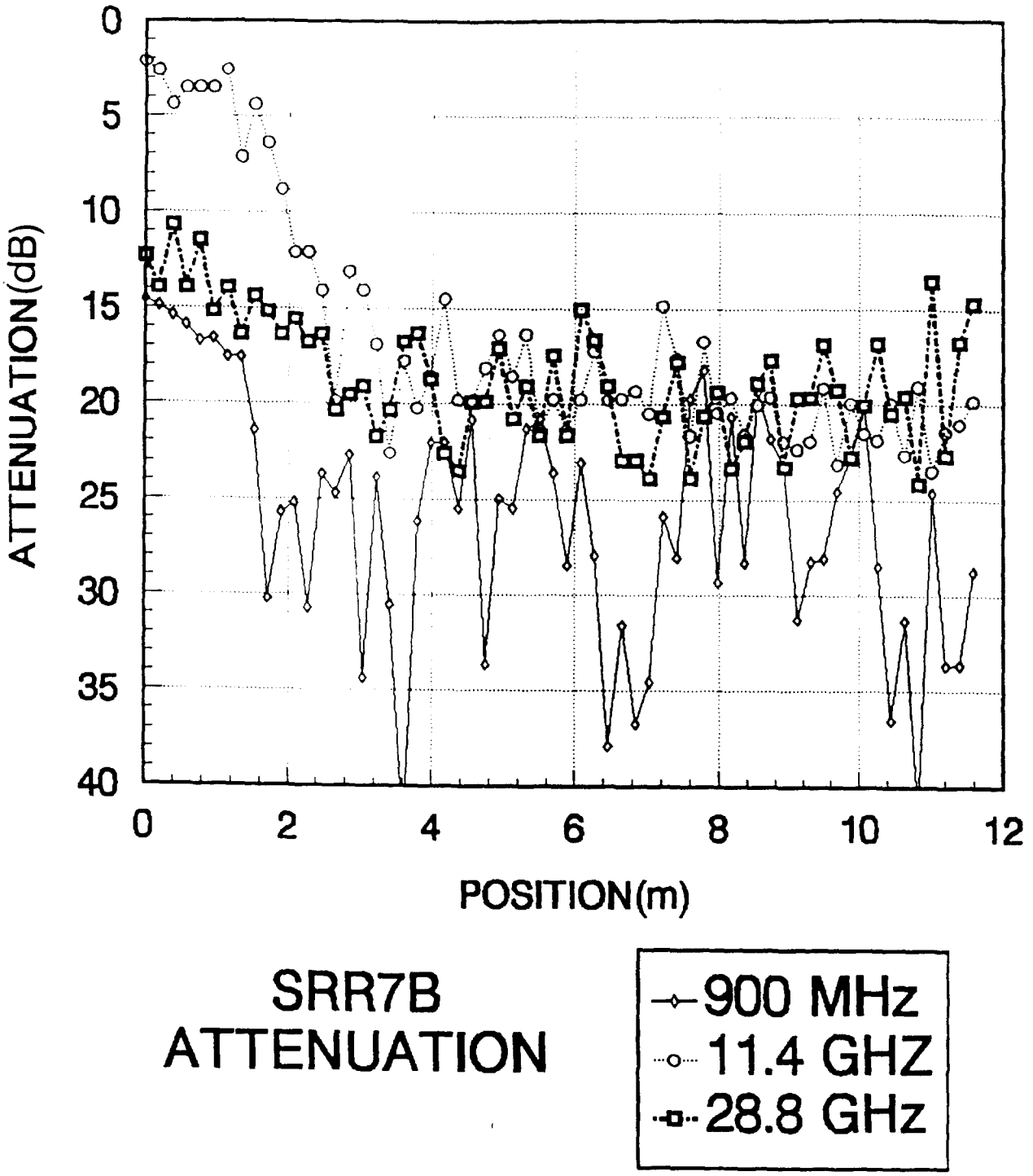

Figure A-56. Penetration loss for storeroom path SRR7B.

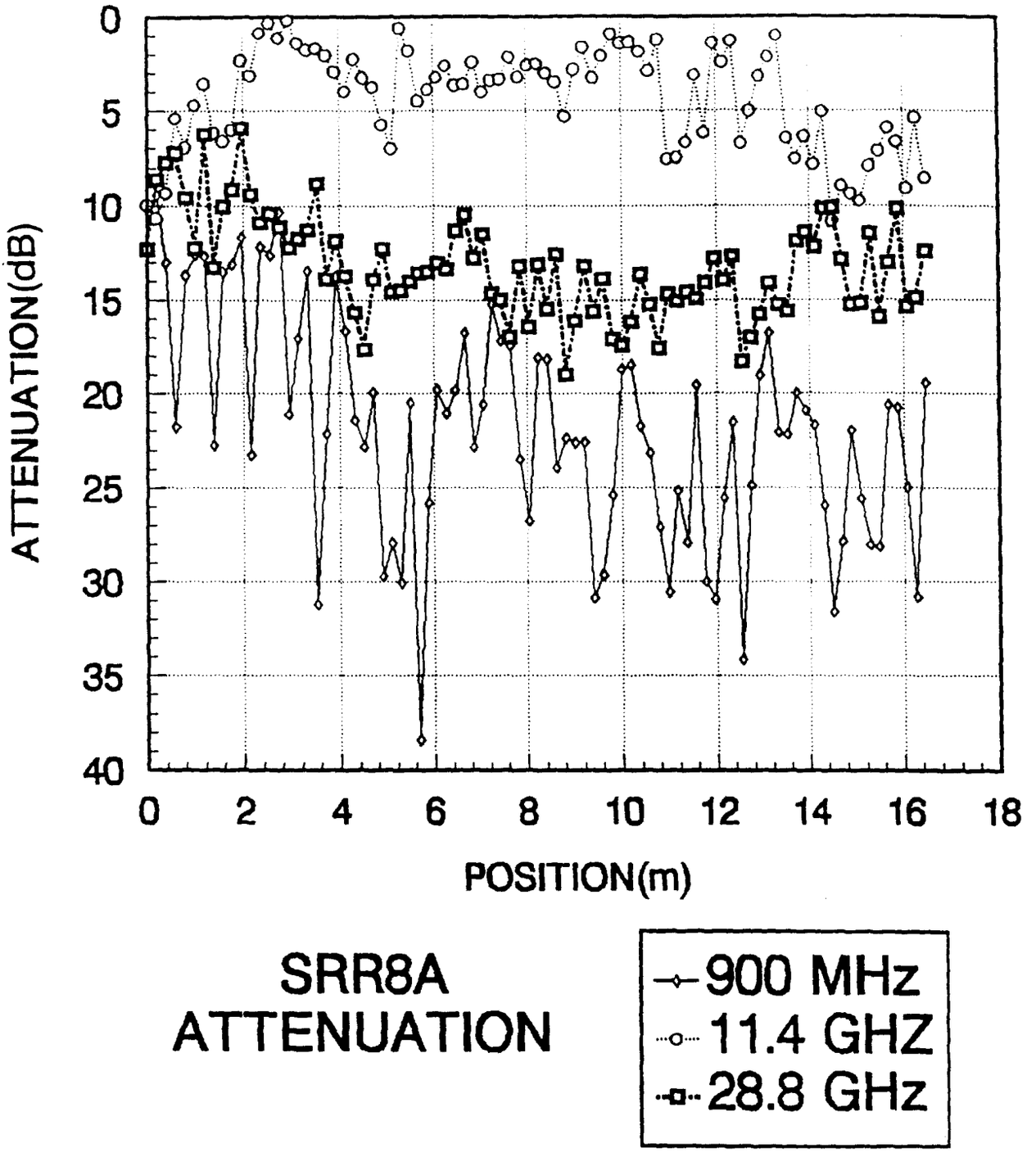

Figure A-57. Penetration loss for storeroom path SRR8A.

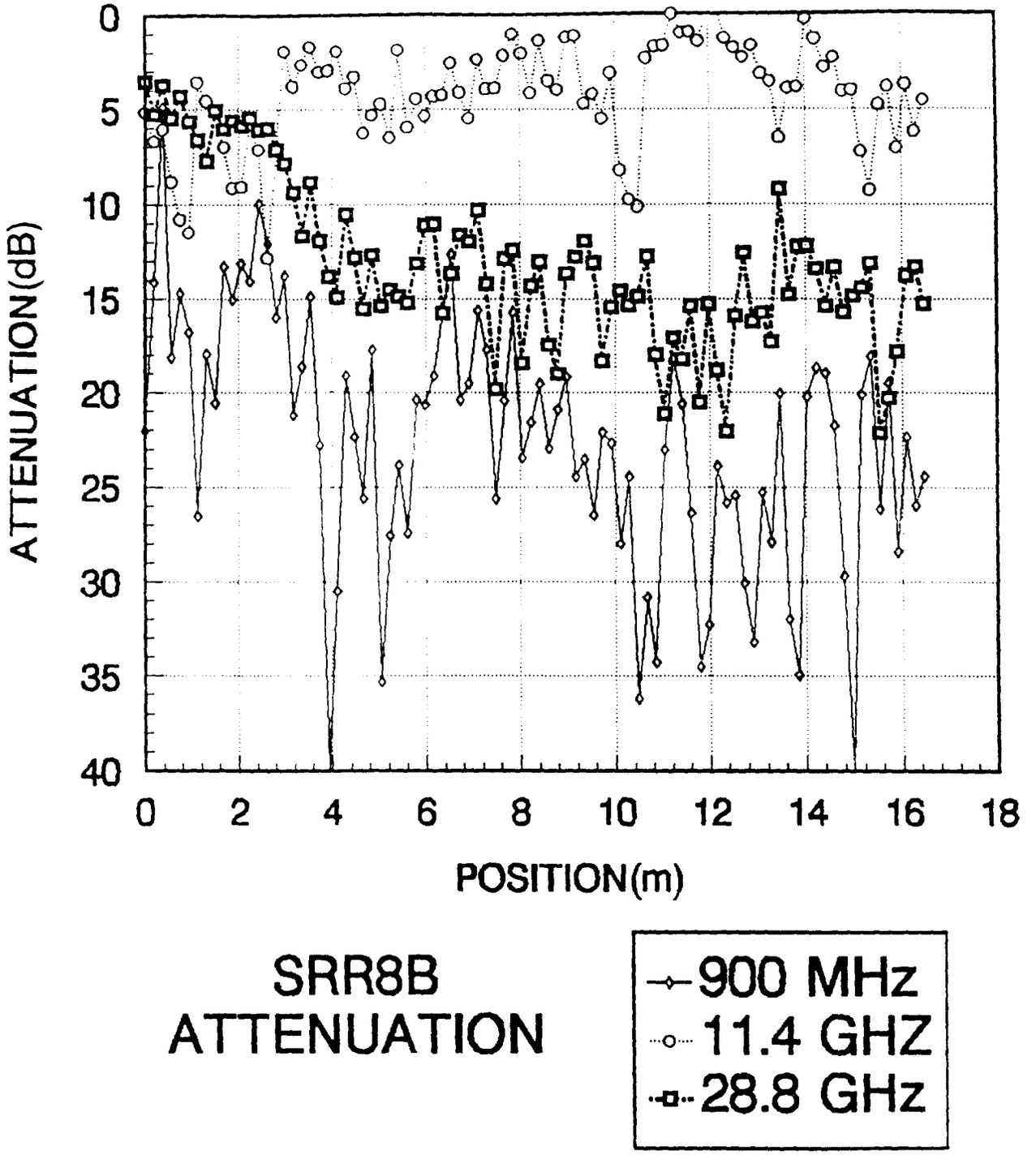

Figure A-58. Penetration loss for storeroom path SRR8B.

FORM **NTIA-29**
(4-80)

U.S. DEPARTMENT OF COMMERCE
NAT'L. TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

BIBLIOGRAPHIC DATA SHEET

	1. PUBLICATION NO.	2. Gov't Accession No.	3. Recipient's Accession No.
	94-306		

4. TITLE AND SUBTITLE	5. Publication Date
Building Penetration and Loss Measurements at 900 MHz, 11.4 GHz, and 28.8 GHz.	May 1994
	6. Performing Organization Code: NTIA/ITS
7. AUTHOR(S)	9. Project/Task/Work Unit No.
8. PERFORMING ORGANIZATION NAME AND ADDRESS National Telecommunications and Information Administration Institute for Telecommunication Sciences 325 Broadway Boulder, CO. 80303	10. Contract/Grant No.
11. Sponsoring Organization Name and Address National Telecommunications & Information Administration Institute for Telecommunication Sciences 325 Broadway Boulder, CO. 80303-3328	12. Type of Report and Period Covered 13.

14. SUPPLEMENTARY NOTES

15. ABSTRACT *(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)*

The feasibility of using radio frequencies in the super high frequency (SHF) band (3-30 GHz) for Personal Communications Services (PCS) in buildings depends on the multipath within the structure and the amount of attenuation experienced by the electromagnetic waves passing through the structures. This study measured these effects to obtain a quantitative estimate of the attenuation magnitude. This magnitude can then be used for link margin analysis to determine if personal communications at SHF is practical.

16. Key Words *(Alphabetical order, separated by semicolons)*

Building attenuation; Measurements; Penetration attenuation; Personal communications; PCS.

17. AVAILABILITY STATEMENT	18. Security Class. *(This report)*	20. Number of pages
☒ UNLIMITED.		101
☐ FOR OFFICIAL DISTRIBUTION	19. Security Class. *(This page)*	21. Price:

NTIA Report 95-325

Building Penetration Measurements From Low-height Base Stations At 912, 1920, and 5990 MHz

Lynette H. Loew
Yeh Lo
Michael G. Laflin
Elizabeth E. Pol

U.S. DEPARTMENT OF COMMERCE
Ronald H. Brown, Secretary

Larry Irving, Assistant Secretary
for Communications and Information

September 1995

PRODUCT DISCLAIMER

Certain commercial companies, equipment, instruments, and materials are identified in this paper to specify adequately the technical aspects of the reported results. In no case does such identification imply recommendation or endorsement by the National Telecommunications and Information Administration, nor does it imply that the material or equipment identified is necessarily the best available for the purpose.

CONTENTS

CONTENTS (cont'd)

FIGURES

FIGURES (cont'd)

FIGURES (cont'd)

FIGURES (cont'd)

FIGURES (cont'd)

TABLES

TABLES (cont'd)

GLOSSARY OF TERMS

The following terms are described in order to avoid confusion and make clear the procedures employed during the gathering and analysis of the data presented in this report. They are not necessarily identical to the complete, rigorous or mathematical definitions of the terms.

building penetration loss
The ratio in median signal strength between the measurement obtained inside the building and the reference signal level measured outside the building at street level. This interpretation of building penetration is similar to that given by the International Telecommunication Union-Radiocommunications (ITU-R), formerly CCIR [1].

high-rise building
A multistory office building in an urban environment.

line-of-sight transmission path
A straight line path between the transmitter and building under test which is not obstructed by any buildings.

median value
The median value of the path loss measurements in one area, such as one room within a building or one corner of a high-rise building.

mean value
The average value of the medians calculated for all rooms in a residence and all corners for each level of a high-rise building.

non-line-of-sight transmission path
A straight line path between the transmitter and building under test that is obstructed by at least one building.

path loss
Attenuation undergone by an electromagnetic wave in transit between a transmitter and receiver. In this report, path loss refers to the median loss experienced, calculated from the received signal level.

reference signal level
The median of the line-of-sight field intensity measured at street level outside the wall of the building under test closest to the transmitter. If the transmitter is nearest to a corner of the building under test, we use the average value of the measurement of the two walls that make up that corner.

residential building
A single family house in a suburban area.